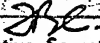


EXECUTIVE SECRETARIAT**Routing Slip**

TO:		ACTION	INFO	DATE	INITIAL
1	DCI				
2	DDCI				
3	EXDIR				
4	D/ICS				
5	DDI				
6	DDA				
7	DDO				
8	DDS&T				
9	Chm/NIC	X			
10	GC				
11	IG				
12	Compt				
13	D/EEO				
14	D/Pers				
15	D/OEA				
16	C/PAD/OEA				
17	SA/IA				
18	AG/DCI				
19	C/IPD/OIS				
20	DD/OGI		X		
21					
22					
SUSPENSE		STAT			
		Date			

Remarks:

Please respond directly.


 Executive Secretary

17 June 82

Date

3637 (10-8-11)

NSC review completed.

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SOURCE	CIA CONTROL NO.
NSC NSC	TS820231/2
DOC. NO. 90399	DATE DOCUMENT RECEIVED
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NATIONAL SECURITY COUNCIL
WASHINGTON, D.C. 20508

SYSTEM 11
90399

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with TOP SECRET ATTACHMENTS

June 16, 1982

MEMORANDUM FOR L. PAUL BREMER III
Executive Secretary
Department of State

DAVID PICKFORD
Executive Secretary
Department of the Treasury

LTC. ROBERT P. MEEHAN
Assistant for Interagency Matters
Office of the Secretary of Defense

STEPHEN SHIPLEY
Executive Assistant to the Secretary
Department of the Interior

JEAN JONES
Director, Executive Secretariat
Department of Commerce

WILLIAM V. VITALE
Director, Office of the Executive Secretariat
Department of Energy

WILLIAM SCHNEIDER
Associate Director for National Security and
International Affairs
Office of Management and Budget

THOMAS B. CORMACK
Executive Secretary
Central Intelligence Agency

ROGER PORTER
Special Assistant to the President
for Policy Development

JAMES BURNHAM
Special Assistant to the Chairman
Council of Economic Advisers

COL. CHARLES F. STEBBINS
Executive Assistant to the Chairman
Joint Chiefs of Staff

SHEILA DRYDEN
Special Assistant to the Director
Federal Emergency Management Agency

SUBJECT: Next Meeting of Overview Group for NSSD 9-82

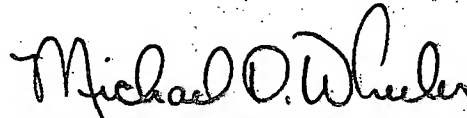
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with TOP SECRET ATTACHMENTS
Review June 15, 1988

T5820231/2
CV 3 of 2

CONFIDENTIAL

2

There will be an Overview Group meeting for NSSD-9 at 2:00 p.m., June 22, 1982, in the White House Situation Room. The purpose of the meeting is to discuss the revised drafts prepared by the CIA of Section I-A and B, and II-A, B, and C which are enclosed. In addition, the meeting will review general progress and timing of the study. The attached NSSD-9 worksheets have been compiled to facilitate this discussion. Could you please notify Miss Pat Battenfield (395-4985) of your representative to the meeting.



Michael O. Wheeler
Staff Secretary

Attachments:

NSSD-9 Control Sheet
NSSD-9 Section I-A and B (draft)
NSSD-9 Section II-A, B, and C (draft)

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TOP SECRET

NSSD-9 CONTROL SHEET - Status as of 6/16/82

25X1

SECTION	LEAD/NAME	OUTLINE	DRAFT	REVISED DRAFT	NEXT REVIEW		STATUS; MAJOR PROBLEMS
					W.G.	Over	
I-A (Projections)	CIA/	5/14	5/17	6/11		6/22	revised draft cleared by working group; to be reviewed by over. group
		5/14	5/17	6/11		6/22	" " "
I-B (Trade)	CIA/	5/14	5/17	6/11		6/22	" " "
		5/19	5/17	6/9			
II-A (Disruption Size)	CIA/	5/14	5/28	6/11		6/22	first draft cleared by working group; to be reviewed by over. group
		5/19	6/2				
II-B (Disruption Source)	CIA/	5/17	5/28	6/18		6/22	" " "
		5/19	6/2				
II-C (Disruption Lik.)	CIA/	5/17	5/28	6/18		6/22	" " "
II-D	CIA/						Overall section to be drafted 7/6
II-D-1a (Econ. Consequences)	CEA/Zychar OMB/Glozier	5/14	6/22			6/22	Outline agreed. Range of oil consumption to be agreed by over.
		5/19					
II-D-1b (Pol/Mil Cons.)	STATE/Burns	5/14	6/22				First draft to be completed by 6/22 for review by working group
		5/19					
II-D-2a3 (Gas/Coal Disrupt.)	STATE/Burns	5/14	6/22				" " "
		5/19					
III-A (Pol. Decar)	STATE/Burns	5/28	6/16	6/30			Awaiting input from NSSD-4
III-B-1 (Market Res.)	DOE/Blanken- ship OPD/Boggs	5/28	6/11	6/30			Draft to be distributed to working group 6/14
		5/26	6/14				
III-B-2 (Safety Net)	STATE/Burns	5/28					Need input from II-D before draft can be written
		6/2					
III-B-3 (Mar. Imped.)	DOE/Bradley	5/28	6/30				comments on outline due ASAP; draft due 6/30
		5/26					
III-B-4 (Long Term Tech.)	DOE/Bradley	5/28	6/30				" " "
		5/26					
IV-A (Crisis Manage)	NSC/Nau	5/28	6/18	6/30			not organized yet
IV-B (US/NATO Req.)	DOD/Tarbell	5/28	6/18	6/30			outline distributed 6/1. Restricted circulation requested.
		5/28					
IV-C (SPR)	DOE/Blanken- ship	5/28	6/18	6/30			outline dist. 5/28; draft 6/14
		5/28	6/14				
IV-D (Intl' Strat.)	STATE/Burns DOD/Tarbell	5/28	6/18	6/30			not organized yet

TOP SECRET

TOP SECRETI-A Plausible ProjectionsOUTLINE

Evaluate existing projections of energy supply, demand and trade.

in	from and to	over
oil	OECD	present-1985
gas	Communist Countries	1985-1990
coal	LDCs	1990-2000

WORKING GROUP

Chairman: /CIA 25X1
 Support: /CIA

Burns/State 632-0641
 Tarbell/DOD 695-2659
 Glozer/OMB 395-3040
 Boggs/OPD 456-6252
 Stanley-Miller/DOE 252-5893
 Brodman/DOE 252-5893

Knickmeyer/State 632-0786
 /DIA 692-5147 25X1
 Nau/NSC 395-6961
 Curry/Treasury 566-5071
 Crump/JCS 695-3819
 Zycker/CEA 395-5680

DUE DATES

<u>Subject</u>	<u>Date Due</u>	<u>Date Completed</u>
Outline	5/14/82	5/14/82
Draft	5/17/82	5/17/82
Revised Draft	6/11/82	6/9/82
Issues Defined	6/16/82	

STATUS

<u>Date</u>	<u>Status</u>
6/4	Nau expresses need for adequate range of demand with central cluster; stresses need to review assumptions of different forecasts.
6/7	Comments received on first draft; revised draft to be distributed 6/9.
6/16	Working group revised draft submitted to overview group for consideration on 6/22

TOP SECRET

I-B Assess U.S. and Allied Oil,
and Coal Trade

OUTLINE

Assess U.S. and allied levels of imports under best and worse case economic assumptions.

WORKING GROUP

Chairman: CIA

Burns/State 632-0641
Tarbell/DOD 695-2659
Glozer/OMB 395-3040
Boggs/OPD 456-6252
Stanley-Miller/DOE 252-5893
Brodman/DOE 252-5893

Knickmeyer/State 632-0786
/DIA 692-5147
Nau/NSC 395-6961
Curry/Treasury 566-5071
Crump/JCS 695-3819
Zycker/CEA 395-5680

25X1

25X1

25X1

DUE DATES

<u>Subject</u>	<u>Date Due</u>	<u>Date Completed</u>
Outline	5/14/82	5/14/82
Draft	5/17/82	5/16/82
Revised Draft	6/11/82	6/9/82
Issues Defined	6/16/82	

STATUS

<u>Date</u>	<u>Status</u>
6/7	Draft being revised for distribution 6/9.
6/16	Working Group Agreed Revised Draft submitted to Overview Group for consideration 6/22

TOP SECRET

TOP SECRET

II-A Size and Duration of
DisruptionsOUTLINE

Size and duration of disruptions of oil, gas and oil imports vulnerability.

- definition of vulnerability for U.S and for allies
- disruption scenarios needed to cause such vulnerability under best and worse case import projections

WORKING GROUP

Chairman: /CIA

25X1

Burns/State 632-0641
 Tarbell/DOD 695-2659
 Glozer/OMB 395-3040
 Boggs/OPD 456-6252
 Stanley-Miller/DOE 252-5893
 Brodman/DOE 252-5893

Knickmeyer/State 632-0786
 /DIA 692-5147
 Nau/NSC 395-6961
 Curry/Treasury 566-5071
 Crump/JCS 695-3819
 Zycker/CEA 395-5680

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DUE DATES

<u>Subject</u>	<u>Date Due</u>	<u>Date Completed</u>
Outline	5/14/82	5/14/82
Draft	5/28/82	6/2/82
Revised Draft	6/11/82	6/12/82
Issues Defined	6/16/82	

STATUS

<u>Date</u>	<u>Status</u>
6/2	First draft out for review; comments due 6/9.
6/16	Working Group agreed revised draft submitted to Overview Group for consideration

TOP SECRET

TOP SECRETII-B Sources of DisruptionsOUTLINE

Sources of such disruptions.

- assessment of economic and political instabilities in key exporting countries under best and worse case supply and demand projections
 - consequences of oil price decline for revenues, domestic development and political stability
- assessment of key international conflicts affecting supply
 - Middle East/Persian Gulf
 - Southern Africa
 - Libya and the tripartite Alliance
 - U.S.-Soviet confrontation in Central Europe
 - technical or accidental disruptions

WORKING GROUPChairman: /CIA

25X1

Burns/State 632-0641
 Tarbell/DOD 695-2659
 Glozer/OMB 395-3040
 Boggs/OPD 456-6252
 Stanley-Miller/DOE 252-5893
 Brodman/DOE 252-5893

Knickmeyer/State 632-0786

DIA 692-5147 25X1

Nau/NSC 395-6961

Curry/Treasury 566-5071

Crump/JCS 695-3819

Zycker/CEA 395-5680

DUE DATES

<u>Subject</u>	<u>Date Due</u>	<u>Date Completed</u>
Outline	5/17/82	5/19/82
Draft	5/28/82	6/2/82
Revised Draft	6/18/82	6/16/82
Issues Defined	6/23/82	

STATUS

<u>Date</u>	<u>Status</u>
6/2	First draft out for review; comments due 6/9.
6/16	Working Group agreed revised draft submitted to Overview group for consideration

TOP SECRET

TOP SECRET

II-C Likelihood of DisruptionsOUTLINE

Likelihood of such disruptions

- classification of most likely and least likely sources of disruption
- policy judgment of most secure and insecure sources

WORKING GROUPE

Chairman:

CIA

25X1
25X1

Burns/State 632-0641
 Tarbell/DOD 695-2659
 Glozer/OMB 395-3040
 Boggs/OPD 456-6252
 Stanley-Miller/DOE 252-5893
 Brodman/DOE 252-5893

Knickmeyer/State 632-0786
 [redacted]/DIA 692-5147
 Nau/NSC 395-6961
 Curry/Treasury 566-5071
 Crump/JCS 695-3819
 Zycker/CEA 395-5680

25X1

DUE DATES

<u>Subject</u>	<u>Date Due</u>	<u>Date Completed</u>
Outline	5/17/82	5/19/82
Draft	5/28/82	6/2/82
Revised Draft	6/18/82	6/1/82
Issues Defined	6/23/82	

STATUS

<u>Date</u>	<u>Status</u>
6/2	First draft out; comments due 6/9.
6/1	Working Group Agreed revised draft submitted to Overview group for consideration

TOP SECRET

TOP SECRET

II - D

Working Group

Chairman: /CIA

25X1

(Substance has been divided into several sections which follow; coordination is managed by)

25X1

TOP SECRET

II-D-1 (a&b) Consequences of Such DisruptionsOUTLINE

II-D-1 Oil

a) Economic

WORKING GROUP

Chairmen: Glozer/OMB 395-3040
 Zycker/CEA 395-5680

Blankenship/DOE
 Boggs/OPD 456-6252
 Curry/Treasury 695-2659

Stanley-Miller/DOE 252-5893

Tarbell/DOD 695-2659
 Witting/State 632-3019

25X1

DUE DATES

<u>Subject</u>	<u>Date Due</u>	<u>Date Completed</u>
Outline	5/14/82	5/19
Draft	6/22/82	
Revised Draft		
Issues Defined		

STATUS

<u>Date</u>	<u>Status</u>
6/4	Agreed methodology and detailed outline; waiting for projections and disruption cases; need to decide whether SPR study range is adequate. Next step is to run cases: micro (quantitative and qualitative) and macro (only qualitative).
6/9	NAU, [] and Glozer agree to study wider range of oil consumption in 1990 than SPR cases; This issue is to be considered by overview group on 6/22

25X1

TOP SECRET

TOP SECRET

II-D-1 (a&b) Consequences of Such DisruptionsOUTLINE

II-D-1 Oil (Continued)

b) Political Military

WORKING Group

Chairman: Burns/State 632-0641

Tarbell/DOD 695-2659

House/DOE

Brodman/DOE 252-5893

[] CIA []

Martin/NSC 395-5607

Limprecht/State 395-4930

Knickmeyer/State 632-0786

Glozer/OMB 395-3040

Zyker/CEA 395-5680

Curry/Treasury 695-2659

Stanley-Miller/DOE 252-5893

[] CIA []

Witting/State 632-3019

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DUE DATESSubjectDate DueDate Completed

Outline

5/14/82

5/19/82

Draft

6/22/82

Revised Draft

Issues Defined

STATUSDateStatus

6/2

outline distributed.

6/9

Comments on outline discussed at working group meeting
draft of sections due 6/22.

TOP SECRET

II-D-2 Consequences of Gas Disruptions
 D-3 Consequences of Coal Disruptions

OUTLINE

Consequences of such disruptions

WORKING GROUP

Chairman: Burns/State 632-0641

Support: Ries/State (gas) 632-1445

Medeiros/State (coal) 632-2181

Tarbell/DOD 695-2659

House/DOE

Brodman/DOE 252-5893

[]/CIA []

Martin/NSC 395-5607

Glozer/OMB 395-3040

Zyker/CEA 395-5680

Curry/Treasury 695-2659

Stanley-Miller/DOE 252-5893

[] CIA []

Knickmeyer/State 632-3019

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DUE DATES

Subject

Date Due

Date Completed

Outline

5/14/82

5/19/82

Draft

6/22/82

Revised Draft

Issues Defined

STATUS

Date

Status

6/2

outline distributed.

6/9

Comments due on outline; draft expected 6/22

TOP SECRET

TOP SECRET

III-A Policies to Deter DisruptionsOUTLINE

Policies to deter disruptions.

1. assessment of secure and insecure sources of supply
 - definition of secure and insecure sources
 - trends in U.S. and allied imports from insecure sources
 - market obstacles to increased investment in and reliance on more secure sources
2. key policies
 - U.S. and allied bilateral (security, diplomatic and political) policies toward key exporters
 - U.S. and allied bilateral policies toward regions or multilateral organizations of exporters (OPEC, Arab oil exporters, etc.)
 - U.S. and allied multilateral policies toward suppliers
 - thru IEA
 - thru NATO
 - thru UN

25X1

WORKING GROUP

Chairman: Burns/State 632-0641

Tarbell/DOD 695-2659

House/DOE

Brodman/DOE 252-5893

[]/CIA []

Martin/NSC 395-5607

Knickmeyer/State

Glozer/OMB 395-3040

Zyker/CEA 395-5680

Curry/Treasury 695-2659

Stanley-Miller/DOE 252-5893

[]/CIA []

25X1

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DUE DATES

<u>Subject</u>	<u>Date Due</u>	<u>Date Completed</u>
Outline	5/28/82	
Draft	6/16/82	
Revised Draft	6/30/82	
Issues Defined	7/2/82	

STATUS

<u>Date</u>	<u>Status</u>
6/7	No activity to date.
6/16	awaiting input from NSSD-4 (note:there is some

TOP SECRET**III-B-1 Policies to Minimize Effects of Disruptions - Reliance on Market****OUTLINE**

Policies to minimize effects of disruption.

1. First line of defense, reliance on the market
 - expected behavior of market under various types of disruptions (consequences for U.S. and allies)
 - role of private sector
 - changing role of oil companies in world market

WORKING GROUP

Chairman: Blankenship/DOE
 Boggs/OPD

[]/CIA []
 Zycker/CEA 395-5680
 Burns/State 632-0641

Tarbell/DOD 695-2659
 Glozer/OMB 395-3040
 Martin/NSC 395-5607

25X1

DUE DATES

<u>Subject</u>	<u>Date Due</u>	<u>Date Completed</u>
Outline	5/28/82	5/26/82
Draft	6/11/82	6/14/82
Revised Draft	6/30/82	
Issues Defined	7/2/82	

STATUS

<u>Date</u>	<u>Status</u>
5/26/82	Outline distributed.
6/14/82	Draft expected to be distributed to working group

TOP SECRET

TOP SECRET

III-B-2 Policies to Minimize Effects of Disruptions - National and International Safety Net Measures

OUTLINE

Policies to minimize effects of disruption.

2. National and international safety net measures

- review of national measures in allied countries (stocks, surge capacity, etc.)
- review of international measures (IEA Emergency Sharing System, collective measures for gas vulnerability, etc.)

25X1

WORKING GROUP

Chairman: Burns/State 632-0641

Tarbell/DOD 695-2659

House/DOE

Brodman/DOE 252-5893

[]/CIA []

Martin/NSC 395-5607

Witting/State 632-3019

Glozer/OMB 395-3040

Zyker/CEA 395-5680

Curry/Treasury 695-2659

Stanley-Miller/DOE 252-5893

[] CIA []

25X1

25X1

25X1

DUE DATES

<u>Subject</u>	<u>Date Due</u>	<u>Date Completed</u>
Outline	5/28/82*	6/2/82
Draft		
Revised Draft		
Issue Defined		

STATUS

<u>Date</u>	<u>Status</u>
6/2/82	Draft of outline distributed for comment by 6/9.
6/16/82	Need input from II-D before draft can be prepared

* Initially due 5/10

TOP SECRET

TOP SECRET

III-B-3 Policies to Minimize Effect of
Disruptions - Removing International
Market Impediments to Near-term Alternatives

OUTLINE

Removing international market impediments to near-term alternatives.

WORKING GROUP

Chairman: Bradley/DOE 252-5858

Burns/State 632-0641
 Boggs/OPD 456-6252
 Martin/NSC 395-5607
 Knickmeyer/State 632-0786
 Tarbell/DOD 695-2659
 Glozer/OMB 395-3040

[]/CIA [] 25X1
 Curry/Treasury 566-5071

[]/DIA 692-5147 25X1

Crump/JCS 695-3819

Zycker/CEA 395-5680

DUE DATES

<u>Subject</u>	<u>Date Due</u>	<u>Date Completed</u>
Outline	5/28/82	5/26/82
Draft	6/30/82	
Revised Draft		
Issues Defined		

STATUS

<u>Date</u>	<u>Status</u>
5/26/82	Outline distributed; awaiting comment.
6/16/82	No comments received on outline; need comments by 6/23 so that draft can be completed by 6/30.

TOP SECRET

TOP SECRET

III-B-4 Policies to Minimize Effect of
Disruptions - Development of Long-Term,
High-Risk Energy Technologies

OUTLINE

Development of long-term, high-risk energy technologies.

25X1

WORKING GROUP

Chairman: Bradley/DOE 252-5858

Burns/State 632-0641
 Boggs/OPD 456-6252
 Martin/NSC 395-5607
 Knickmeyer/State 632-0786
 Tarbell/DOD 695-2659
 Glozer/OMB 395-3040

[]/CIA [] 25X1
 Curry/Treasury 566-5071
 []/DIA 692-5147 25X1
 Crump/JCS 695-3819
 Zycker/CEA 395-5680
 Prochnik/State 632-4413

DUE DATES

<u>Subject</u>	<u>Date Due</u>	<u>Date Completed</u>
Outline	5/28/82	5/26/82
Draft		
Revised Draft		
• Issues Defined		

STATUS

<u>Date</u>	<u>Status</u>
5/26/82	Outline distributed; awaiting comment.
6/16/82	No comments received; need comments on outline by 6/23 so that draft can be prepared by 6/30.

TOP SECRET

IV-A Crisis Management - Adequacy of Crisis
Decision-Making Mechanisms

OUTLINE

Adequacy of crisis decision-making mechanisms.

WORKING GROUP

Chairman: NSC

DUE DATES

<u>Subject</u>	<u>Date Due</u>	<u>Date Completed</u>
Outline	5/28/82	
Draft	6/18/82	
Revised Draft	6/30/82	
Issues Defined	7/2/82	

STATUS

<u>Date</u>	<u>Status</u>
-------------	---------------

TOP SECRET

TOP SECRET

IV-B Crisis Management - Meeting U.S.
and NATO Military Requirements

OUTLINE

Meeting U.S. and NATO military requirements

25X1

WORKING GROUP

Chairman: Tarbell/DOD 695-2659

Burns/State 632-0641

[]/CIA []

Bradley/DOE 252-5858

Limprecht/State 632-9750

Crump/JCS 695-3819

Jeffers/DOD 697-2500

Nau/NSC 395-6961

Mazaka/DOE 252-6114

Winkler/DOE 252-2443

Brinkerhoff/FEMA 287-3904

[]/DIA 692-5147

Donnelly/DOD 695-7458

25X1

25X1

DUE DATES

<u>Subject</u>	<u>Date Due</u>	<u>Date Completed</u>
Outline	5/28/82	5/27/82
Draft	6/18/82	
Revised Draft	6/30/82	
Issues Defined	7/2/82	

STATUS

<u>Date</u>	<u>Status</u>
5/27/82	Outline distributed for comment by 6/1/82

TOP SECRET

TOP SECRET

IV-C Crisis Management - Efficient Use of
SPR Under Conditions of Uncertainty

OUTLINE

Efficient use of SPR under conditions of uncertainty.

WORKING GROUP

Chairman: Blankenship/DOE

25X1

Zycker/CEA 395-5680

Burns/State 632-0641

Glozer/OMB 395-3040

Tarbell/DOD 695-2659

[]/CIA []

Glozer/OMB 395-3040

Martin/NSC 395-5607

25X1

DUE DATES

<u>Subject</u>	<u>Date Due</u>	<u>Date Completed</u>
Outline	5/28/82	5/28/82
Draft	6/18/82	6/14/82
Revised Draft	6/30/82	
Issues Defined	7/2/82	

STATUS

<u>Date</u>	<u>Status</u>
5/28/82	Outline distribution; draft 6/14
6/14	Draft out to working group (to be discussed by working group 6/21/82)

TOP SECRET

IV-D Crisis Management - International
Strategies to Contain and Terminate
Disruptions

OUTLINE

International strategies to contain and terminate disruptions

1. Military Measures
2. Diplomatic and Military
3. Economic Coordination
4. Use of IEA Emergency Sharing System

WORKING GROUP

Chairman: Burns/State 632-0641
Tarbell/DOD 695-2659

DUE DATES

<u>Subject</u>	<u>Date Due</u>	<u>Date Completed</u>
Outline	5/28/82	
Draft	6/18/82	
Revised Draft	6/30/82	
Issues Defined	7/2/82	

STATUS

<u>Date</u>	<u>Status</u>
6/7/82	No activity to date

TOP SECRET

SECRET

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Free World Energy Supply and Demand Projections¹Summary Table
(million b/d oil equivalent)

	<u>1980</u>	<u>1985</u>	<u>1990</u>	<u>2000</u>
Total Free World Energy Consumption	94	102-107	116-119	143-152
Free World Oil Consumption	49	48-52	50-53	55-58
OECD	38	35-39	33-38	31-35
Rest of Free World	11	13-15	15-18	21-24
Free World Oil Supply	50	48-52	48-53	49-58
OECD	15	13-16	12-16	13-17
OPEC	28	23-28	23-29	24-30
Other LDCs	6	8-9	8-11	9-13
CPE (Imports) Exports	1	(1)-1	(2)-1	(1)-1
OPEC Oil Production Capacity				
Maximum Sustainable	33-34	30-35	29-41	26-43
Available		23-33	27-32	24-32
US Total Energy	36	37-41	40-43	43-45
Non-oil Consumption	19	21-24	24-28	29-30
Oil Consumption	17	15-17	15-16	14-16
Net (Imports) Exports				
Oil	(6)	(5)-(3)	(5)-(8)	(4)-(6)
Gas	(1)	(1)	(1)	(1)
Coal	1	1-2	2	3-4
Western Europe Total Energy	26	27-29	29-31	32-33
Non-oil Consumption	13	14-15	16-19	20-22
Oil Consumption	13	12-14	11-14	12-14
Net (Imports) Exports				
Oil	(11)	(9)-(10)	(8)-(11)	(7)-(11)
Gas	(1)	(1)	(1)-(2)	(2)-(3)
Coal	(1)	(1)-(2)	(2)-(3)	(4)-(5)
Japan Total Energy	7	8-10	9-13	11-14
Non-oil Consumption	2	3-4	4-6	6-9
Oil Consumption	5	5-7	4-7	4-6
Net (Imports) Exports				
Oil	(5)	(5)-(7)	(4)-(7)	(4)-(6)
Gas	(1)	(1)	(1)	(2)
Coal	(1)	(1)	(2)-(3)	(1)-(2)

¹ Assumptions: Economic growth rates vary widely among forecasts regarding time intervals and geographic regions. There exists a general consensus of Free World GNP growth of approximately 3 percent per year from 1980 to 2000. Consensus price view assumes real oil prices decline to 1985, rise thereafter by between 2-3 percent per year to 2000.

NOTE: A few extreme estimates were not included in the ranges. The WEO demand projections for 2000 and the high demand case in 1990, for example, imply an excess demand situation.

energy projection tables in the appendix array these forecast results. The summary table (Table 1) provides the ranges in 1985, 1990 and 2000 for those forecasts which we believe fall within a plausible range. A few forecasts lie outside this range but were rejected because of analytic inconsistencies in how the forecast was prepared.* (Table 2) (S)

The available projections of long term energy supply and demand all indicate moderate growth in Free World energy demand through the end of the century. Free World energy consumption is expected to rise at an average annual rate of 2.2 percent during this decade from 94 million b/d oil equivalent in 1980 to 116-119 million b/d oil equivalent in 1990. Free World energy demand is projected to range between 143-152 million b/d oil equivalent in 2000. Most of the growth is expected to be met by non-oil fuels, primarily coal and nuclear power. (S)

Energy demand is expected to grow faster in developing countries, particularly oil producing countries, than in the OECD countries. OECD's share of total Free World energy demand is projected to decline from 85 percent in 1980 to roughly 75 percent in 1990 and 70 percent in 2000. In sharp contrast, energy demand in the developing countries is expected to grow by 4-5 percent per year resulting in a sharp increase in their share of total energy demand. (S)

* See footnote on page 5.

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Energy Market Outlook

The success of long term forecasts in predicting outcomes in the world energy market has been minimal. Because of uncertainties regarding economic performance, price trends, and consumer response to higher prices, most forecasts have substantially overestimated energy demand in recent years and understated the energy savings from conservation and technological change. In addition, most forecasters have been wrong about supply availability, failing to predict the large increases that have occurred in Mexican production in recent years and predicting a noticeable drop in US production which has failed to materialize as yet. Recent long term forecasts remain vulnerable to the shortcomings of past projections because most of the results are based on assumptions about highly uncertain variables such as economic growth, energy prices, and the degree of response of supply and demand to changes in prices. Because of the uncertain nature of energy market forecasts, we have examined them with an eye toward formulating a reasonable range of demand for energy generally and oil in particular. (S)

Recent Industry and Government Forecasts

The survey of recent energy market projections include estimates by major oil companies, governments, consulting firms and international organizations completed in late 1981 and early 1982. Many of these forecasts do not use econometric models but are built from the estimates of various regional markets. The

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Table 2
Free World Oil Supply and Demand 1990

Mid Range Forecast¹

(million b/d)

(Key Assumptions)

Total Consumption	OECD		United States		Western Europe		Japan		Non-Communists	Oil Price ²	Average Annual Economic Growth
	Consumption	Production	Consumption	Production	Consumption	Production	Consumption	Production	Exports (Imports)		
52	35	14	16	9	12	3	6	-	0	37	3.1

1. Based on available forecasts.

2. OPEC benchmark price per barrel in 1981 dollars.

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expected to range between 24-30 million b/d or roughly half of total Free World oil requirements.* (S)

Assessing Forecasts

To derive a plausible range for 1990 estimates of oil consumption, we examined the critical assumptions used to arrive at the forecast estimates. In assessing these assumptions, we examined their reasonableness with respect to the other assumptions and compared them with historical results. Among the key assumptions examined were price paths, economic growth, elasticities, and productive capacity.

Prices

Most of the energy supply/demand projections from which we derived this range of forecasts assume flat or declining real oil prices to the mid 1980s, with prices rising thereafter by 2-3 percent per year in real terms through 2000. On balance, these price paths seem reasonable and are consistent with other elements in the forecasts. The benchmark OPEC oil price assumed in these forecasts for 1990 range from \$34-40 per barrel in constant 1981 dollars (Table 3). Price assumptions for 2000 range from \$43-54 per barrel (1981 dollars). Other energy prices

* Of the recent energy market forecasts available for comparison, including those of five major oil companies, a major consulting firm, and the US Department of Energy, we rejected only the OECD World Energy Outlook (WEO) high demand forecast for 1990 and the WEO high and low demand forecast for 2000. In each of these cases, the forecast projects excess demand for oil rather than arriving at a market clearing solution by allowing prices to rise. While consumption could rise to this level based on the assumption of constant real prices, constraints on productive capacity make this result improbable.

are also assumed to increase; coal prices for example are expected to rise but remain competitive with oil. Natural gas prices are expected to move upward; the level of gas prices relative to oil will vary depending on the region. (S)

While crude oil prices are projected to increase by 2-3 percent annually in real terms after 1985, forecasters are quick to point out that this price path may not be a smooth one. Real oil prices increased over 800 percent between 1970 and 1980; between 1974 and 1978, however, real prices actually declined about 8 percent. Some earlier forecasts assumed real prices would rise at a 5 percent annual rate. Recent changes in energy consumption patterns suggest that such a price path is more likely to result from a supply disruption rather than continued growth in oil consumption. (S)

Growth

Growth assumptions are critical in forecasting long term energy supply and demand levels because a small change in the annual GNP growth over the period causes a substantial change in energy requirements. One forecast estimates that a one percent change in annual GNP growth during the 1980s would cause a 8 million b/d oil equivalent change in Free World energy demand and a 2.4 million b/d change in oil consumption in 1990. (S)

Free World GNP growth of 3.1 percent annually during the 1980s is the consensus view of the forecasts we used to identify a cluster case projection. The OECD countries are expected to show average growth during the period of about 2.7 percent while

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Key Assumptions of Forecasts

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Table 3

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	Free World Economic Growth Average Annual Percent Change 1980-2000	Oil Price (OPEC Benchmark) 1981 \$ per barrel		
		1985	1990	2000
Firm A	3	32.50	35.90-37.70	43.75-50.65
Firm B	NA	34.50	37.15	43.15
Firm C	3.2 ¹	34.50-35.50	36.95-39.95	45.95-53.70
Firm D	3			
WEO High	3.2 ²	28.00	28.00	28.00
WEO Low	2.6 ²	29.00	33.60	43.35
Firm E	3	34.00	35.05	NA
Firm F	3.2	29.10	40.14	47.65

¹ World
² OECD

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oil exporting and developing country growth rates are assumed to increase 4-5 percent annually. Given last year's economic record and expectations for 1982, GNP growth in the OECD would have to average 3.1 percent annually during the balance of the decade to achieve the 2.7 percent average for the 1980s as a whole. The consensus view of a 2.2 percent annual increase in energy demand during the 1980s implies an energy/GNP ratio of 0.7. This may be on the high side; during the 1970s the ratio averaged 0.6. (S)

The assumption of 3 percent average annual growth in free world GNP used is a reasonable central case. Actual growth of course could be appreciably different. A reasonable upper range estimate might be a four percent rate for the 1980s. This would be roughly consistent with the rate of economic growth achieved during the 1970s, and would require rates of growth averaging 4.4% during the balance of the 1980s. Although this may not have a high probability of materializing, it could constitute a reasonable outer bound. A two percent annual rate is a reasonable low case. 1990. (S)

Another factor which could cause differences in oil consumption during any period up to 1990 is the business cycle. Even if GNP growth averages 3 percent annually over the period, there would likely be sharp variations from year to year which, in turn, would cause differences in the level of energy and oil demand. The observed annual growth pattern in OECD countries over the course of the most recent business cycle (1976-81) yields an average growth rate of about 2.7 percent although year to year variations range from 4.9 percent in 1976 to 1.3 percent

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last year. Replicating these year to year growth patterns through 1990 yields a difference of as much as 2.3 million b/d oil equivalent in energy consumption in certain years as opposed to using a smooth 2.7 percent growth rate each year. In both cases, 1990 energy consumption is the same. (S)

Price Elasticities

The responsiveness of oil or energy demand to a change in price is a key factor in determining the ultimate level of demand and the price needed to clear the market. There is almost unanimous agreement among forecasters that the demand for oil and energy is inelastic--relatively unresponsive to price changes--in the short term. Over the longer term, it is generally agreed that demand becomes more responsive to changes in price although it remains relatively inelastic. (S)

Most forecasters disagree on the magnitude of the price elasticity for oil and the rate of change over time. Estimates of the first-year end use oil price elasticities taken from a variety of energy forecasts range from .1 to .3. The lower estimate implies, for example, that a price change of 10 percent is needed to induce a one percent change in consumption. The higher figure implies a 3.3 percent price change is needed to change consumption by one percent. Estimates of the long run elasticity of demand for oil are in the range of .35 to .8. All estimates of demand elasticities used in the forecasts evaluated in this study fall within the above ranges. (S)

The supply response to changes in prices is also a major factor in assessing the level of future energy/oil production and

Table 4

Free World: Oil Productive Capacity¹

(million b/d)

	<u>1985</u>	<u>1990</u>
<u>OPEC</u>	33.5	32.5
<u>Persian Gulf</u>	23.7	23.4
Saudi Arabia	10.7	10.7
Iran	4.0	3.5
Iraq	4.0	4.5
Kuwait	1.6	1.5
UAE	2.2	2.1
Qatar	0.7	0.7
Neutral Zone	0.5	0.4
<u>Other OPEC</u>	9.8	9.1
Algeria	1.1	0.9
Libya	2.2	2.4
Nigeria	2.0	1.9
Venezuela	2.4	2.2
Ecuador	0.2	0.2
Indonesia	1.7	1.4
Gabon	0.2	0.1
<u>Non-OPEC</u>	23.5	23.5
United States	9.8	9.5
Mexico	4.0	4.5
North Sea	3.2	3.2
Egypt	0.7	0.8
Other	5.8	5.5
<u>Total</u>	<u>57.0</u>	<u>56.0</u>

1. Represents maximum sustainable capacity and includes Natural gas liquids.

price levels. Most observers agree that the supply response is also relatively inelastic in the short term because of fixed levels of productive capacity and government policies. There are no generally agreed upon estimates of supply elasticities and many forecasters assume that supply levels are given or base their estimates on existing and planned levels of capacity. (S)

Productive Capacity

Based on the midpoint of the consensus range of forecasts, estimated Free World oil productive capacity is expected to average about 56-57 million b/d during the late 1980s (Table 4). Taking everything together, this is a reasonable estimate.

OPEC Capacity

OPEC oil productive capacity estimates of 32.5-33.5 million b/d fall close to the midpoint of the range for maximum sustainable capacity (MSC). Allowances have been made for Kuwait and the United Arab Emirates because they have demonstrated a reluctance to increase output to maximum levels. Available forecasts indicate OPEC capacity will likely hold at about 30-33 million b/d through 2000. This assumes productive capacity in Iran and Iraq combined returns to 8 million b/d or only slightly below levels existing prior to the Iranian revolution. This seems plausible under the existing regimes in both countries. In one extreme case, however, a major oil company projects a steady expansion of OPEC maximum sustainable capacity, reaching a level of 42.5 million b/d in 2000, with available capacity projected at

about 31-32 million b/d. This extreme estimate of sustainable capacity appears highly optimistic, however, given the stated intentions of certain OPEC members such as Saudi Arabia and Kuwait. (S)

Non-OPEC Capacity

Non-OPEC productive capacity was estimated from the midpoint of the consensus range for OECD and non-OPEC LDC oil supplies at about 23.5 million b/d. Except during periods of unusual weakness in the oil market, non-OPEC producers will be operating at or near MSC. In the present weak market, about 700,000 b/d of surplus capacity exists in non-OPEC countries, a level that is assumed to be a reasonable maximum. The capacity estimates for the non-OPEC group were rounded upward to take into account the very small amounts of underutilized capacity that might exist in some areas. (S)

In these forecasts for 1990, US oil production estimates range from 7.1 million b/d to 10 million b/d compared with actual production of 10.2 million in 1981. While US production has not risen in the wake of sharply higher prices, it has also not declined as many forecasters earlier predicted. Several knowledgeable industry sources, including prominent geologists, argue that there are insufficient reserves remaining to be discovered to sustain high levels of US production. Others argue that price incentives and the release of new acreage for exploration will provide enough new oil to keep output high. Synfuel output--viewed optimistically by several forecasters as a

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new source of supply just a few months ago--now appears to be dead for the remainder of this decade. (S)

Projections of net CPE oil trade with the Free World in 1990 range from .5 million b/d net exports to 2 million b/d net imports. All forecasts point to a continued decline in net CPE exports to the West. In addition to the level of Soviet oil production (not specified in most of these forecasts), a key factor in determining the level of Communist oil trade is the amount of natural gas that can be used to free up oil supplies for export, especially from Eastern Europe. Even if Soviet oil production declines or stagnates as some observers expect, the export of oil could be maintained at fairly high levels through substitution of natural gas. The clustering of forecasts around a zero net Communist export level appears to be a reasonable assumption. (S)

Beyond 1990

Many variables will influence the development and maintenance of productive capacity over the next two decades. More factors are likely to contribute to capacity being on the lower end of these projections than are likely to force capacity upwards. Revenue needs provide the best motivation for capacity expansion, but most revenue-short countries are also resource constrained. OPEC members in this group--such as Nigeria and Indonesia--will have to pursue active exploration and development programs just to maintain capacity or prevent a rapid erosion of current capabilities. Countries with the current potential to

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significantly boost productive capacity--primarily the revenue surplus OPEC states--are, for a variety of reasons, more likely to restrain development.

- o During periods of rising oil prices, revenue needs are unlikely to prompt capacity development.

- o During periods of slack oil markets, revenues are reduced and budget considerations may force cutbacks in "non-essential" development. (S)

A large price increase would spur, at least initially, exploration and development work on the part of oil companies by improving the economics of crude production in more expensive, high risk areas. Increased development activity and plans on the part of companies may, however, be only a short-term phenomenon. (S)

Interfuel Substitution

Most forecasts do not explicitly treat the potential for interfuel substitution citing only assumptions about relative price levels and in some cases indicating where potential supply constraints may exist. Most of the estimates of coal and natural gas consumption are based on announced intentions to switch fuels, available supplies in each sector, and government policies toward fuel substitution where applicable. (S)

The Plausible NSSD Forecast Range in Brief

After eliminating those forecasts which appeared unrealistic because of assumptions used in their preparation, oil consumption

estimates for 1990 range from a low of 50 million b/d to a high of 53 million b/d. While these forecasts represent a plausible range of oil consumption estimates, we believe the range is too narrow for a period 8 years in the future. (S)

A critical examination of the assumptions indicates a need for a wider range in potential consumption.

- o The assumption of three percent annual growth, while reasonable, does not allow for potentially stronger or weaker growth during the decade. A high growth path of 4 percent per year and a low path of 2 percent average annual growth appear to be reasonable upper and lower bounds.
- o Year to year variations in growth due to the effects of the business cycle are not accounted for in these forecasts. Variability above and below the average growth for the period can account for sizable swings in energy consumption.
- o While 1990 estimates are given, the price path used to arrive at these estimates can give entirely different consumption figures along the way. Consumption in any one year may be higher than in 1990, particularly if the average increase in real prices assumed occurs in a one or two year period late in the decade.
- o The oil price path will also have a significant impact on the availability of non-oil supplies, especially given the long lead times in developing the supplies and the ability to use them. Should oil prices remain

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Table A
1990 Free World Oil Supply and Demand
Plausible Range

million b/d

Total Consumption	OECD		United States		Western Europe		Japan		Rest of Free World	
	Consumption	Production	Consumption	Production	Consumption	Production	Consumption	Production	Consumption	Production
48-55	32-39	12-16	14-17	7-10	11-14	3-4	4-6	-	14-19	31-41

I. Based on range of available forecasts adjusted for higher or lower growth path.

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weak early in the period, some non-oil supplies may not materialize.

- o Technological change as it relates to the use of oil and energy could sharply alter consumption patterns.

While this factor is likely to cause a reduction in oil use, it is difficult to make a reasonable estimate of the magnitude. (S)

On balance, we believe a plausible range of oil consumption estimates for 1990 could be 48 to 55 million b/d after considering the potential for variability in economic growth, the impact of the business cycle, potential price paths, and non-oil supply availability. In order for demand to exceed this level, economic growth would have to be substantially higher than seems reasonable to expect or energy usage for a given level of GNP would have to increase, reversing recent trends. For this to occur, real oil prices must remain flat or even decline throughout the decade. This seems unlikely particularly given the outlook for productive capacity. (S)

Implications for Energy Trade

The major industrialized countries, mainly Japan and Western Europe, are expected to remain heavily dependent on imported energy supplies, particularly oil, through the end of the century. Japan and Europe are expected to depend on imported energy for roughly 80 and 50 percent respectively of total energy requirements during the remainder of the century while the U.S. will import about 15 percent of total energy supplies. Although

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oil consumption is projected to hold fairly steady, oil imports are still expected to account for about one-third of European energy requirements in 1990 and 2000. Oil imports as a percent of Japanese energy requirements are expected to fall from about 60 percent in 1990 to 40 percent in 2000. Projections indicate that the US will depend on oil imports to meet roughly 15 percent of total energy needs in 1990 and 2000. The assessments on energy trade do not take into account any temporary demand surges associated with the business cycle or other factors. (S)

Oil

Because OECD oil production is projected to remain relatively flat at about 14 to 16 million b/d in both 1990 and 2000, the expected drop in oil consumption results in a direct drop in OECD net oil imports from 23.5 million b/d in 1980 to about 20-23 million b/d in 1990 and 18-21 million b/d in 2000. Since both OECD oil consumption and oil imports decline at about the same rate, OECD dependence on oil imports as a fraction of oil consumption remains fairly stable at about 60 percent. Although US oil consumption is projected to decline from 17 million b/d in 1980 to 16 million b/d in 1990, net oil imports are expected to increase from 5.4 million b/d in 1981 to about 6 million b/d in 1990, as a result of a projected decline in domestic oil production. If production does not decline, imports would be about 5 million b/d. Projections on U.S. oil imports after 1990 vary from 4 to 6 million b/d due in part to the

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uncertainty about the contribution of synfuels to total production. (S)

US Military Requirements in Peacetime

The US military peacetime oil requirements are expected to remain at about current levels of 400-500 thousand b/d through 1990. Roughly 60 percent of peacetime requirements are consumed in the United States. Most of the products consumed--about 64 percent--are produced in the United States. Since oil is consumed as refined products, sources of crude oil for refining varies within the region. (S)

US Military Requirements by Region

(thousand b/d)

EUCOM	72
PACOM	75
LANTCOM	14
SOCOM	2
Southwest Asia/IO	21
CONOS and ALASKA	300
	<u>484</u>

Sources of Oil Imports

Table 6 shows the sources of oil imports by region for 1981. Although no estimates are available for 1985 and beyond, it is clear that OPEC will retain its position as the principal supplier of internationally traded oil. In 1981 some 20.5 million b/d or nearly 80 percent of the OECD's oil imports came from OPEC member countries and 12 million b/d or nearly 60

percent of the OECD's imports came from OAPEC member countries. Saudi Arabia was the largest single external source of OECD oil supplies in 1981, followed by the U.A.E., Libya, Nigeria, Indonesia, and Venezuela. Saudi Arabia was also the largest single external source of oil supplies for each of the separate OECD countries and regions. (S)

In 1981, Japan was most dependent on OPEC oil supplies followed by Western Europe, Australia-New Zealand, Canada and the United States. Western Europe and Japan were also considerably more dependent than the rest of the OECD on OAPEC member countries as an external source of oil supply. While there has been considerable change in the mix of individual sources of oil supplies imported by OECD countries, the overall share of total oil imports from OPEC and OAPEC sources has not changed significantly over time in most OECD countries. (S)

Natural Gas

Natural gas use is expected to remain about 20 percent of total energy through 2000. Total Free World gas consumption is projected to increase from about 17 million b/d oil equivalent in 1980 to 22 million b/d oil equivalent in 1990 and about 27 million b/d oil equivalent by 2000 (a growth rate of about 2 percent per year). Most projections indicate both Europe and Japan will experience a significant increase in natural gas consumption. During the 1980s, gas availability is expected to

be limited by the lack of transportation and handling facilities. These factors will be less of a constraint in the 1990s. (S)

Increased natural gas production is expected to occur primarily outside the traditional gas consuming countries. US gas production is projected to be supplemented by pipeline and LNG imports from Canada and Mexico but no major increase in the total volume of US imports is expected. Western European natural gas production is expected to hold fairly steady at about 3 million b/d oil equivalent to 1995 and decline thereafter to less than 3 million b/d oil equivalent by 2000. During the same period, Western European consumption is projected to increase from just under 4 million b/d oil equivalent in 1980 to about 5 million b/d oil equivalent by 2000. The resulting increase in natural gas imports, primarily from Africa and the USSR, will significantly increase Western Europe's vulnerability to disruptions in natural gas supplies. Japanese imports of LNG are expected to also increase substantially, more than doubling from less than 1 million b/d oil equivalent in 1980 to over 2 million b/d oil equivalent by the year 2000. Much of the incremental volumes will be provided by a number of relatively secure suppliers such as Australia and Canada. Demand for natural gas is projected to also increase in Mexico and the OPEC nations where it will represent the only significant diversification away from oil use over the next two decades. (S)

Coal

Free World coal consumption is projected to increase from 18 million b/d oil equivalent in 1980 to about 26 million b/d oil equivalent in 1990 and about 37 million b/d oil equivalent in 2000. This 3.5-4 percent annual gain will push coal's share of total energy from 20 percent in 1980 to about 25 percent by 2000. The strongest growth in production will occur in the U.S., followed by Australia, South Africa, and Canada. Coal's current price competitiveness will be maintained or increased in the late 1980s if the world once again experiences real oil price increases, and price will continue to be the determining factor in the expansion of trade in coal. The US will remain a large net exporter of coal, more than doubling current export volume by 2000. The LDCs and CPEs will also increase their volume of coal exports. (S)

Coal trade in the OECD area is expected to grow considerably over the next two decades, with the largest absolute increases occurring after 1990. Total coal imports by OECD countries were nearly 3 million b/d oil equivalent in 1980, with intra-OECD coal trade accounting for all but 0.5 million b/d oil equivalent of the OECD's imports. Western Europe was the largest coal importer in 1980, followed by Japan and Canada. The U.S. was the largest coal exporter in the OECD in 1980, followed by Australia, Western Europe and Canada. The largest external source of OECD coal imports in 1980 was South Africa, followed by Poland and smaller quantities from the Soviet Union and others. (S)

Coal trade within Western Europe is expected to decline

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gradually over time and the bulk of the increase in Western European coal imports is projected to come from the U.S. and Australia, followed by a steady increase in imports from South Africa and new coal exporting countries, primarily Columbia.

Western European imports of coal from Poland and the Soviet Union might increase by a relatively small amount. Japan's principal sources of coal imports in the future are likely to be Australia, the United States and Canada, with smaller amounts also supplied by South Africa, China and the Soviet Union. (S)

ESTIMATED OECD IMPORTS OF CRUDE OIL AND REFINED PRODUCTS
1981
(thousand b/d)

	<u>United States</u> ¹	<u>Canada</u>	<u>Japan</u>	<u>Western Europe</u>	<u>Other OECD</u>	<u>Total OECD</u>
Algeria	303	17	47	437	0	804
Bahrain *	0	0	27	4	14	45
Egypt	36	0	5	213	0	254
Iraq *	19	N	58	430	0	507
Kuwait *	1	12	255	279	36	583
Libya	432	8	21	724	0	1,185
Qatar *	7	0	150	182	5	344
Saudi Arabia *	1,247	170	1,708	3,979	128	7,232
Syria	6	0	3	18	0	27
UAE *	197	3	581	449	17	1,247
OAPEC	2,248	210	2,855	6,715	200	12,228
Ecuador	49	0	26	1	0	76
Gabon	45	0	0	56	0	101
Indonesia	386	0	705	35	42	1,168
Iran *	4	0	135	343	0	482
Nigeria	672	4	21	483	0	1,180
Venezuela	594	147	47	373	0	1,161
OPEC	3,956	361	3,754	7,771	228	16,070
Canada	445	0	8	10	1	0
Mexico	555	58	72	290	0	975
Other 2	984	148	781	2,049	65	3,185
Total	5,982	567	4,650	10,355	308	20,556
of which						
Persian Gulf countries	1,475	185	2,914	5,666	200	10,440

1. Traced to source of crude.

2. Includes unknown.

* Persian Gulf countries.

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(million b/d oil equivalent)

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Total Free World Energy Consumption	F 102.0	E 102.4	WEO 104.5	A 104.8	D 105.6	WEO 106.7			Range 102-107
Free World Oil Consumption	WEO 48.0	B 48.5	E 48.8	DOE 49.0	WEO 50.0	F 50.0	A 50.6	D 51.6	Range 48-52
OECD	F 35.0	WEO 35.2	WEO 35.8	DOE 36.2	D 38.3	IEA 38.9			Range 35-39
Rest of Free World	WEO 12.8	DOE 12.8	D 13.3	WEO 14.2	F 15.0				Range 12-15
Free World Oil Supply	WEO 48.0	DOE 49.0	B 49.0	E 49.0	F 50.0	WEO 50.0	A 50.6	C 51.2	
								D 52.3	Range 48-52
OECD	C 12.9	IEA 14.2	D 14.3	DOE 14.6	A 14.9	WEO 15.0	E 15.1	F 16.0	Range 13-16
OPEC	WEO 23.0	E 23.2	B 23.9	F 25.0	DOE 25.4	WEO 26.0	A 26.3	D 28.4	
								C 28.5	Range 23-28
Other LDCs	WEO 8.0	A 8.7	F 9.0	D 9.0	DOE 9.0	C 9.1	WEO 9.3	E 9.3	Range 8-9
CPE (Imports) Exports	WEO (1)	D (0.1)	F 0	DOE 0	B 0.6	C 0.7	A 0.7	E 0.8	
								WEO 1.0	Range (1)-2
OPEC Oil Productive Capacity									
Maximum Sustainable	DOE 29.7 - 35.0		CIA 32.0 - 34.5						Range 30-35
Available	IEA 23.0 - 26.0		CIA 30.0 - 32.5						Range 23-33
US Total Energy Consumption	E 37.4	A 38.5	D 39.8	IEA 40.7					Range 37-41
Non-Oil	E 21.4	A 22.7	D 23.3	IEA 24.0					Range 21-24
Oil	B 15.4	A 15.8	E 16.0	F 16.0	DOE 16.2	D 16.5	IEA 16.7		Range 15-17
Net Trade (Imports) Exports									
Oil	F (5.1)	E (5.6)	DOE (6.4)	D (6.8)	IEA (7.1)	A (7.5)			Range (5)-(8)
Gas	C (1.1)	IEA (0.9)	DOE (0.8)	A (0.2)					(1)
Coal	C 1.2	IEA 1.3	DOE 1.4	A 1.5					Range 1-2

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Western Europe	A	E	WEO	DRI	WEO	IEA	D		Range
Total Energy Consumption	26.7	26.7	27.5	27.7	27.8	28.4	28.6		27-29
Non-Oil	A	E	DRI	D	WEO	WEO	IEA		Range
	13.9	14.0	14.5	15.0	15.2	15.3	15.3		14-15
Oil	WEO	WEO	DOE	E	A	IEA	DRI	D	Range
	12.2	12.6	12.6	12.7	12.8	13.1	13.2	13.6	12-14
Net Trade (Imports)									
Exports									
Oil	A	WEO	DOE	WEO	E	IEA	DRI	D	Range
	(8.9)	(9.1)	(9.2)	(9.5)	(9.5)	(9.9)	(10.0)	(10.4)	(9)-(10)
Gas	IEA	C	WEO	WEO	DOE	DRI			(1)
	(1.2)	(1.1)	(0.8)	(0.8)	(0.7)	(0.6)			
Coal	WEO	WEO	IEA	C	DOE	DRI			Range
	(2.1)	(1.8)	(1.8)	(1.7)	(1.4)	(1.2)			(2)-(1)
Japan Total Energy Consumption	E	D	A	IEA					Range
	7.8	8.3	8.5	10.4					8-10
Non-Oil	D	A	E	IEA					Range
	3.1	3.2	3.3	3.9					3-4
Oil	E	D	A	DOE	IEA				Range
	4.5	5.2	5.3	5.4	6.5				5-7
Net Trade (Imports)									
Exports									
Oil	E	D	A	DOE	IEA				Range
	(4.5)	(5.2)	(5.3)	(5.4)	(6.5)				(5)-(6)
Gas	IEA	C	DOE						Range
	(0.7)	(0.9)	(1.0)						(1)
Coal	C	DOE	IEA						Range
	(1.3)	(1.4)	(1.4)						(1)

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Energy Projections

(million b/d oil equivalent)

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Total Free World Energy Consumption	E 115.7	F 116.0	WEO 117.2	D 117.3	A 118.5	WEO 125.4			Range 116-125
Free World Oil Consumption	B 49.9	WEO 50.0	DOE 50.7	E 50.7	F 51.0	A 52.7	C 53.0	D 53.1	Range 50-56
	WEO 56								
OECD	F 33.0	WEO 34.0	DOE 35.1	C 36.0	WEO 37.0	IEA 37.3	D 37.8		Range 33-38
Rest of Free World	D 15.3	DOE 15.6	WEO 16.0	C 17.0	F 18.0	WEO 19			Range 15-19
Free World Oil Supply	WEO 48.0	E 50.7	DOE 50.7	WEO 52.0	A 52.7	C 53.1	D 53.1		Range 48-53
OECD	C 12.4	WEO 13.2	WEO 13.4	D 13.8	IEA 14.3	DOE 14.8	F 15.0	A 15.6	Range 12-16
	E 16.0								
OPEC	E 23.0	B 24.7	A 25.8	DOE 26.3	WEO 27.0	C 27.9	D 28.5	WEO 29.0	Range 23-29
	F 29.0								
LDCs	WEO 8.0	F 9.0	DOE 9.6	C 10.1	D 10.4	E 10.7	WEO 11.0	A 11.2	Range 8-11
CPE (Imports) Exports	F (2.0)	WEO (2.0)	D (0.5)	WEO 0	DOE 0	A 0.1	E 0.5		Range (2)-1
OPEC Productive Capacity									
Maximum Sustainable	DOE 29.1-35.9		CIA 30.5-34.0	A 40.8					Range 29-41
Available	IEA 27.0-29.0	CIA 27.5-32.0		A 31.3					Range 27-32
US Total Energy Consumption	A 39.5	E 40.3	D 41.4	IEA 43.3					Range 40-43
Non-Oil	A 24.2	E 24.3	D 25.7	IEA 28.1					Range 24-28
Oil	B 14.8	IEA 15.2	A 15.3	DOE 15.6	D 15.7	C 16.0	E 16.0	F 16.0	Range 15-16
Net Trade (Imports) Exports									
Oil	F (4.8)	E (5.5)	IEA (5.6)	DOE (6.1)	D (6.3)	A (7.3)	C (8.2)		Range (5)-(8)
Gas	A (0.5)	DOE (0.9)	IEA (1.0)	C (1.1)					Range (1)
Coal	DOE 1.6	IEA 1.8	A 1.9	C 2.1					Range 2

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(million b/d oil equivalent)

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	1990							
Western Europe Total Energy Consumption	E 28.7	A 29.0	WEO 30.6	DRI 31.2	IEA 31.2	D 31.3	WEO 32	Range 29-32
Non-Oil	E 16.2	A 16.7	DRI 17.2	D 17.7	IEA 18.6	WEO 19.4	WEO 20	Range 16-20
Oil	WEO 11.2	C 12.0	WEO 12.0	A 12.3	DOE 12.4	E 12.5	IEA 12.6	Range 11-14
	B 13.1	D 13.6	DRI 14.0					
Net Trade (Imports) Exports								
Oil	A (8.0)	C (8.4)	WEO (8.5)	DOE (9.0)	E (9.1)	WEO (9.3)	IEA (9.6)	Range (8)-(11)
	B (9.9)	D (10.5)	DRI (10.7)					
Gas	DRI (1.3)	C (1.8)	DOE (1.9)	IEA (1.9)	WEO (1.9)	WEO (2.1)		Range (1)-(2)
Coal	DRI (2.1)	DOE (2.5)	C (2.8)	WEO (2.8)	IEA (3.0)	WEO (3.1)		Range (2)-(3)
Japan Total Energy Consumption	E 8.7	D 9.5	A 10.4	IEA 13.0				Range 9-15
Non-Oil	D 3.9	E 4.4	A 4.9	IEA 6.0				Range 4-6
Oil	E 4.3	C 5.0	B 5.1	DOE 5.2	D 5.6	A 5.5	IEA 7.0	Range 4-7
Net Trade (Imports) Exports								
Oil	E (4.3)	C (5.0)	B (5.1)	DOE (5.2)	D (5.6)	A (5.5)	IEA (7.0)	Range (4)-(7)
Gas	IEA (1.2)	DOE (1.3)						Range (1)
Coal	DOE (1.7)	IEA (2.0)	WEO (2.9)					Range (2)-(3)

*Firm C US import requirement figure excludes any synfuel production.

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Energy Projections

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(million b/d oil equivalent)

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2000

Oil Free World Energy Consumption	F 143.0	E 144.0	A 151.9						Range 143-152
World Oil Consumption	DOE 54.5	F 55.0	B 55.1	E 56.8	A 57.9	C 58.0	WEO 58.0	WEO 74.0	Range 55-74
OECD	F 31.0	WEO 33.0	DOE 33.1	C 35.0	WEO 43.0				Range 31-43
Rest of Free World	DOE 21.4	C 23.0	F 24.0	WEO 25.0	WEO 31.0				Range 21-31
World Oil Supply	WEO 49.0	WEO 53.0	DOE 54.5	F 55.0	B 55.1	E 56.8	A 57.9	C 58.4	Range 49-58
OECD	F 13.0	WEO 13.0	C 13.8	WEO 15.0	DOE 15.4	E 16.6	A 16.8		Range 13-17
Non-OECD	WEO 24.0	C 26.0	DOE 27.0	WEO 28.0	E 28.3	B 29.0	A 29.3	F 30.0	Range 24-30
Other LDCs	WEO 9.0	E 10.9	DOE 12.1	A 12.3	C 12.5	WEO 13.0	F 13.0		Range 9-13
Oil Imports (Imports) Exports	WEO (2.0)	F (1.0)	A (0.5)	B (0.2)	DOE 0	E (0.6)			Range (2)-1
Oil Productive Capacity									
Maximum Sustainable	DOE 26.2-33.8		A 42.5						Range 26-43
Available	WEO 24.0-28.0		A 32.1						24-32
Total Energy Consumption	A 43.2	E 45.3							Range 43-45
Non-Oil	A 28.9	E 29.6							Range 29-30
Oil	DOE 14.2	A 14.3	C 15.0	F 15.0	B 15.1	E 15.7			Range 14-16
Net Trade (Imports) Exports									
Oil	F (4.1)	DOE (4.4)	A (5.4)	D (5.7)	E (5.8)	C* (6.1)			Range (4)-(6)
Gas	A (0.4)	DOE (1.0)	C (1.4)						Range (1)
Coal	A 2.6	DOE 2.8	C 4.1						Range 3-4
Western Europe Oil Energy Consumption	E 32.4	A 33.1	WEO 37.0	WEO 43.0					Range 32-43
Non-Oil	E 20.0	A 21.6	WEO 26.5	WEO 27.4					Range 20-27
Oil	WEO 10.5	A 11.5	C 12.0	DOE 12.2	E 12.4	B 14.1	WEO 15.6		Range 11-16

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Net Trade (Imports) Exports	A	WEO	DOE	C	E	B	WEO	Range
Oil	(6.8)	(7.4)	(8.5)	(8.7)	(9.5)	(11.4)	(13.3)	(7)-(13)
Gas	DOE (2.4)	C (2.7)	WEO (2.7)	WEO (2.9)				Range (2)-(3)
Coal	C (4.1)	DOE (4.8)	WEO (5.6)	WEO (5.8)				Range (4)-(6)
Japan Total Energy Consumption	E 10.6	A 14.2						Range 11-14
Non-Oil	E 6.0	A 9.0						Range 6-9
Oil	C 4.0	E 4.6	DOE 5.0	A 5.2	B 5.5			Range 4-6
Net Trade (Imports) Exports								
Oil	C (4.0)	A (5.0)	DOE (5.0)	B (5.5)				Range (4)-(6)
Gas	DOE (1.6)	C (2.0)						Range (2)
Coal	C (1.4)	DOE (2.3)						Range (1)-(2)

*Firm C US import requirement figure excludes synfuel production.

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Table 4
1990 Free World Oil Supply and Demand
Plausible Range

OECD		United States		Western Europe		Japan		Rest of Free World	
Consumption	Production	Consumption	Production	Consumption	Production	Consumption	Production	Consumption	Production
32-39	12-16	14-17	7-10	11-14	3-4	4-6		14-19	31-41

million b/d

Based on range of available forecasts adjusted for higher or lower growth path.

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Table 4
1990 Free World Oil Supply and Demand
Plausible Range

million b/d

Total	OECD		United States		Western Europe		Japan		Rest of Free World	
	Consumption	Production	Consumption	Production	Consumption	Production	Consumption	Production	Consumption	Production

48-55	32-39	12-16	14-17	7-10	11-14	3-4	4-6	-	14-19	31-41
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I. Based on range of available forecasts adjusted for higher or lower growth path.